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EXAMINER

SINGH, RAMNANDAN P

ART UNIT	PAPER NUMBER
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2644

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/029,669

Applicant(s)

ZHANG ET AL.

Examiner

Ramnandan Singh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 16-20 is/are rejected.
- 7) ☒ Claim(s) 10-15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>6/09-15-2003</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims.

**Claim 20** recites the limitations, "a measuring unit operatively connected to receive signals from the near-end and the far-end of a communication link and enabled to detect peak power values of said signal received from said far end of a communication link; and enabled to measure corresponding peak power values of said signal received from said near end of said communication link; and a comparator for estimation of said echo return loss as a ratio of said far-end peak power value to said corresponding near-end peak power value" on page 18, lines 2-7. "A measuring unit" enabled to detect and measure peak power values and "a comparator for estimation of the echo return loss" are not shown. A similar thing holds for claims 1 and 16.

Further, **claim 6** recites the limitations (i) "estimating near-end noise within said near-end signal", (ii) "synthesizing said estimated near-end noise", and (iii) "subtracting said synthesized noise from said near-end signal before measuring said near-end peak power value" in lines 2-5. These three features are not shown.

"Therefore, the above features must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. Fig. 2 is objected to because of the following informalities:

Fig. 2 shows "Echo Canceller 4". This is in error. The near-end terminal 21 has an "echo canceller circuit 28". Replace "Echo Canceller 4" with "Echo Canceller 28" in Fig. 2.

Appropriate correction is required.

### ***Specification***

3. The disclosure is objected to because of the following informalities:

On page 5, Para. 0023, « node 30 » and « node 31 » are not referenced in Figure. Further, on page 8, "ERL Change Suspected state 92" is not referenced in Figure 6. Appropriate correction is required.

### ***Claim Objections***

4. **Claim 5** is objected to because of the following informalities:

Claim 5 recites "said communication link form noise received from said far end" on page 15, line 2. Replace the term "link **form**" with the term link from".

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claim 9** recites the limitation "said refined echo return loss estimate is calculated using a formula that allows the refined estimate to increase in value at a greater rate than it may decrease in value" in lines 2-3. The word "**may**" is indefinite.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim 20 is rejected under 35 U.S.C. 102(b) as being anticipated by Meek [US 5,577,097].

**Regarding claim 20**, Meek teaches an apparatus for estimating an echo return loss (ERL) of a communication link [Abstract], as shown in Fig. 1, comprising:

a measuring unit (i.e. **comprising averaging units, 22 and 24**) [col. 5, lines 4-21], operatively connected to receive signals from the near-end (14) and the far-end (10) of the communication link and enabled to detect peak power values (i.e. **relatively short-term averages to obtain stable peak power values**) of the signal received from the far-end of the communication link; and enabled to measure corresponding peak power values (i.e. **relatively short-term averages**) of the signal received from near-end of the communication link [col. 4, lines 21-29; col. 5, lines 22-41]; and

a comparator for estimation of the echo return loss (i.e. **ERL Estimator 34**) as a ratio of the far-end peak power value (i.e. **relatively short-term average**),  $R_a$ , to the corresponding near-end peak power value (i.e. **relatively short-term average**),  $S_a$ , [col. 4, 21-29; col. 4, line 42 to col. 5, line 3; col. 7, lines 30-34], wherein the far-end signal is comprised of the speech of a far-end user; and the near-end signal is comprised of echoed speech from the far-end signal [See Figure 1; col. 5, lines 47-60; col. 4, lines 6-20].

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-5, 7-9, 16, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meek [US 5,577,097] in view of Lu [US20020131583 A1].

**Regarding claim 1**, Meek teaches a method of estimating an echo return loss (ERL) of a communication link (Abstract), as shown in Fig. 1, comprising:

measuring a peak power value ((i.e. **relatively short-term average to obtain stable peak power value**),  $R_a$ , of a signal, R, received from a far-end (10) of a communication link;

measuring a peak power value ((i.e. **relatively short-term average to obtain stable peak power value**),  $S_a$ , of a signal, S, received from a near-end (14) of a communication link; and

calculating the echo return loss (ERL) estimate (34) as a ratio of the far-end peak power value,  $R_a$ , to the near-end peak power value,  $S_a$ , [col. 4, lines 21-29; col. 4, line 42 to col. 5, line 41; col. 7, lines 30-34], wherein

the far-end signal comprises payload information (i.e. **measured far-end signal**,  $R_a$ ) that the communication link was established to convey, and

the near-end signal includes coupled signal power echo (i.e. **echoed signal power**) from the far-end signal power[See Figure 1; col. 5, lines 47-60; col. 4, lines 6-20].

However, Meek does not disclose expressly measuring a peak power value of a signal within an echo period corresponding to the power period (i.e. **within an echo dispersion region**).

Lu teaches an impulse response characteristics  $h(t)$  of an echo channel spanning the entire echo path delay time, as shown in Fig. 4 [see Abstract]. The entire delay time is shown to have two regions—a flat delay where the impulse response is substantially zero; and **an echo dispersion region** that includes the **active portion**, referred to as a **major body**, where the impulse response has a relatively significant absolute magnitude, i.e. where an echo of the far end signal is created [Fig. 4; Para. 0049]. Similarly, Fig. 6 shows an impulse response characteristics for  $h(t)$  of an echo channel spanning the entire echo path delay time in a VoIP system [Para. 0053]. The adaptive filter shown in Fig. 8 has a filter length substantially equal to a **major body length** of an echo path. Measuring peak power values within the active portion (i.e. **filter length period**) enables to achieve fast convergence of an adaptive filter employed to dynamically measure an ERL [Fig. 9; Para. 0056; 0058; 0060].



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Meek and Lu are analogous art because they are from a similar problem solving area, viz. , echo cancellation in telephonic communications.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of Lu with Meek to measure peak power values of signals within a power period (i.e. **active portion**) for determining an ERL.

The suggestion/motivation for doing so would have been to increase the convergence rate of the adaptive filter and to reduce the steady state residual error [Lu; Para. 0073].

**Claim 16** is essentially similar to claim 1 and is rejected for the reasons stated above.

**Regarding claim 2**, Lu further teaches an example by dividing the filter length of the adaptive filter 400 [Fig. 8] into four sub-windows. Then the level detector determines a maximum value of the first two coefficients in the first sub-window, and stores it in memory [Fig. 9; Para. 0057].

**Regarding claim 3**, Lu further teaches reinitiating (i.e. **shifting the first sub-window towards the active portion**) the start of the first sub-window and detecting a second peak greater than the first peak [Fig. 9 D; Para: 12; Para: 0057].

**Regarding claim 4**, Lu further teaches starting a second sub-window after the termination of the first sub-window [[Fig. 9 D; Para: 0057].

**Regarding claim 5**, Lu further teaches comparing the maximum absolute filter coefficient value (in dB) (i.e. **peak value of a signal**) with a predetermined threshold level [Para. 0058; claim 32].

**Regarding claim 7**, this claim teaches an alternate representation of the echo return loss (ERL) in dB. This representation of ERL is obvious to a person of ordinary skill in the art, when Meek teaches an ERL value of 0, 3, or 6 dB wherein the calculation of these values of ERL in dB implies applying the ERL representation in dB as claimed in this claim [col. 6, lines 36-43].

**Regarding claim 8**, Meek teaches calculating a refined estimate of ERL based on estimated ERL values for a current power period and a number of prior power period [Fig. 1, reference 32; col. 5, lines 23-41].

**Regarding claim 9**, Meek teaches applying a formula for refining an ERL estimate [col. 5, lines 29-36].

**Regarding claim 19**, Meek teaches inhibiting updating the ERL estimate when the near-end power is close to or exceeds the far-end speech power (i.e. **when the signal  $E_n$  is not produced**) wherein comparator 30 controls the production of **the signal  $E_n$**  based on the degree of the echo cancellation [Fig. 1; col. 1, lines 32-35; col. 4, lines 6-21; col. 4, lines 42-53].

11. Claims 6, 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Meek and Lu as applied to claims 1 and 16 above, and further in view of Fujii et al [US 6,683,960 B1].

**Regarding claim 6**, the combination of Meek and Lu does not teach expressly a noise cancellation circuit.

Fujii et al teach a method for active noise cancellation of a signal shown in Fig. 30, comprising:

estimating (i.e. **detecting**) near-end noise,  $x_i$ , with a near-end signal [col. 1, lines 21-25];

synthesizing a secondary noise  $G_i$  with the estimated (i.e. **detected**) noise  $x_i$  ;  
and

subtracting (i.e. **subtractor 204**) the synthesized noise  $G_i$  from the near-end signal (See Fig. 30) [col. 1, lines 26-40].

Meek, Lu and Fujii et al are analogous art because they are from a similar problem solving area, viz., telephonic communications.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of noise cancellation of Fujii et al with Meek.

The suggestion/motivation for doing so would have been to reduce the noise near the microphone 201 [Fujii et al; col. 4, 65-67], and thereby increasing the accuracy of peak power measurements of signals for determining an ERL.

**Regarding claim 17**, Fujii et al teach that the near-end signal also includes the speech of a near-end user and near-end background noise due loudspeaker [Fig. 30; col. 1, lines 9-17].

**Regarding claim 18**, Meek teaches estimating the ERL dynamically and repeatedly every 24 ms [col. 5, lines 4-41].

***Allowable Subject Matter***

12. Claims 10-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is an examiner's statement of reasons for allowance:

Dependent claim 10 identifies the uniquely distinct feature of calculating a refined echo return loss (ERL) estimate for a current power period: (A) when the echo return loss estimate for current power period is greater than or equal to the refined echo return loss estimate for one of the number of prior power periods by applying Equation (2); and (B) when the echo return loss estimate for current power period is less than the refined echo return loss estimate for one of the number of prior power periods by applying Equation (3); wherein Equations (2) and (3) are cited by Applicant [Applicant's specification; Page 11; Para. 0039]. While the closest prior art Meek [US 5,577,097] and Lu [US 20020131583 A1] each teach estimating ERL, Meek disclosing an exponential averaging of ERL and Lu estimating ERL in a n echo dispersion region; neither Meek nor Lu suggest to make an update to the refined estimate of the ERL depending on the ERL state (A) or the ERL state (B). As such, the prior art, either singularly or in combination, fail to anticipate or render the above underlined limitation obvious. Therefore, dependent claim 10 is objected to.

Claims 11-15 are also objected to due to dependence from claim 10.

***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(i) Bridges [US 5,978,763] teaches measuring Echo Return Loss (ERL) [col. 5, lines 29-64];

(ii) Basburg-Ertem et al [US 20020041678 A1] discloses an ERL estimator 72 [Fig. 6]; and

(iii) Maurer [EP 0963057] teaches a method for determining the coupling between two telecommunication paths [Figs. 1, 2a-2c].

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramnandan Singh whose telephone number is (703)308-6270. The examiner can normally be reached on M-F(8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester Isen can be reached on (703)-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ramnandan Singh  
Examiner  
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A handwritten signature in black ink, appearing to be 'RMS' or similar, written in a cursive style.